APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/882,502	06/15/2001	Hung-Han Chen	109410.120	8359

23483 7590 07/06/2004	EXAMINER
WILMER CUTLER PICKERING HALE AND DORR LLP 60 STATE STREET BOSTON, MA 02109	BOOKER, KELVIN E

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Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 June 2001*.
2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-23* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
        application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)
1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date *4,6*.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Detailed Office Action*.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 1-23** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 22 provide for the use of using a machine learning method to predict an outcome by *applying* subsets of data which *correspond* to individual sets of outcomes, whereby a plurality of machine learning methods are employed in developing sets of rules to predict results from a subset. **Claim 17** provides a method for predicting results based upon *evaluating determined rule sets* and *modifying machine learning methods*. However, since the claims do not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 2-16, 18-21 and 23 also do not set forth any active or positive steps delimiting how the claimed invention is practiced.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. **Claims 1-23** are rejected under 35 U.S.C. 101 because the invention as disclosed in claims **1, 17 and 22** are directed to non-statutory subject matter. While the claims are in the technological arts, they are not limited to practical applications in the technological arts.

Specifically, the claims focus on a series of steps to be performed on a computer, but the ideas are disclosed abstractly from any particular practical application. **Claims 1 and 22** use a machine learning method to predict an outcome by *applying subsets of data which correspond to sets of outcomes*, whereby *a plurality of machine learning methods are employed to develop sets of rules to predict results from subsets*, but fail to disclose the steps necessary to enable the claimed process used for: (1) determining how the applied subsets correspond to the determined individual outcomes; (2) establishing which machine methods are employed; and (3) determining how the machine learning methods are used in evaluating the outcomes [either individual or grouped] required for developing the rules used in generating predictions. **Claim 17** generates a prediction based upon *evaluating determined rule sets* and *modifying machine learning methods*, but fails to disclose: (1) the process involved in enabling the functionality necessary for evaluating determined rule sets; (2) establishing which machine methods are employed; and (3) stipulating the process necessary for modifying the claimed machine learning methods used in determining predictions.

To constitutionally interpret the word "process", the Supreme Court has held that: "***A

process is a mode of treatment of certain materials to produce a given result. It is an act, or a

series of acts, performed upon the subject matter to be transformed and reduced to a different

state or thing. ***The Process requires that certain things should be done with certain

substances, and in a certain order; but the tools to be used in doing this may be a secondary

consequence."(emphasis added) Diamond, Commission of Patents and Trademarks v. Diehr and

Lutton, 209 USPQ 1, 6 (1981) quoting Cochrane v. Deener, 94 U.S. 780, 787-788 (1876).

This Constitutional interpretation of the word "process" is a long-standing one that the

Supreme Court requires to be applied in interpreting 35 USC 101. Diamond v. Diehr at 6.

Consequently, the us of that interpretation is Constitutionally required when we interpret the

Federal Circuit's standard that a "new and useful process" is one that produces a useful,

concrete, and tangible result". Cf. State Street Bank & Trust Co. v. Signature Financial Group,

Inc., 47 USPQ2d 1596, 1600-1601 (Fed. Cir. 1998).

Further, **claims 1-23** are directed at a method for using machine learning to predict

outcomes without disclosing any computer implemented processing. Abstract ideas (see

Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759) or the mere manipulation of abstract ideas

(see Schrader, 22 F.3d at 292-93, 30 USPQ2d at 1457-58) are not patentable.

As disclosed, independent **claims 1, 17 and 22** focus on nonfunctional descriptive

material, which is inclusive of the mere arrangement of data without engaging functionality

when employed as a computer component.

Applicant discloses no "certain substances" that have been "transformed or reduced" in

that applicant's claims disclose no specific computer-readable medium, no manipulation of

specific data representing physical objects or activities (pre-computer activity), nor do they

disclose any specific independent physical acts being performed by the invention (post-computer

activity).

The claims merely manipulate abstract ideas in general without limitation to a practical

application where "certain substances" are transformed or reduced.

Claims 2-16, 18-21 and 23 do not cure the defect in the **claims 1, 17 and 22**. On this

basis, **claims 1-23** are rejected under 35 USC 101.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 1, 17 and 22** are rejected under 35 U.S.C. 102(b) as being anticipated by Guan et al.,

"Protein Structure Prediction Using Hybrid AI Methods" [hereafter Guan].

As per claim 1, Guan teaches of a method for rising machine learning to predict an

outcome comprising the steps of:

A. applying a test subset of a data set to a machine learning system, wherein the step of

applying a test subset of data includes applying a first subset of data corresponding to a first

outcome, applying a second subset of data corresponding to a second outcome and consisting of

a set of nearest neighbors to the first outcome, and applying a third subset of data corresponding

to the second outcome [e.g., applying multiple subsets of data, inclusive of nearest neighbor

determinations generated amongst data sets, to a machine learning system for generating

outcomes which can be applied with a combination of search methods for employing machine

learning in generating predictive outcomes] (see abstract; and section 2, page 472, column 1,

paragraph 5 through column 2, paragraph 2: "Given a known...the real structure"); and

B. using a plurality of machine learning methods to develop one or more sets of rules to

predict results from the subset (see section 1, page 472, column 1, paragraph 2; and section 2,

column 1, paragraph 5 through column 2, paragraph 2).

As per claim 17, Guan teaches of a method for using machine learning to predict results

comprising the steps of:

A. applying a representation of a subset of a data set to a machine learning system (see

section 3, page 472, column 2, paragraph 5: "In our system...algorithm search space");

B. repeating for a plurality of cycles:

(1) using a plurality of machine learning methods to develop a set of rules from

the applied representation of the data (see section 1, page 472, column 1, paragraph 2:

"...using a combination...the genetic algorithm");

(2) evaluating the set of rules using a user-selectable fitness function (see section

3, page 472, column 2, paragraph 6, through page 473, column 1, paragraph 2: "The

foundation...the genetic algorithm");

(3) modifying the machine learning methods using the results of the evaluating

step (see section 3, page 472, column 2, paragraph 5, through page 473, column 1,

paragraph 2); and

(4) presenting a final set of rules (see section 3, page 473, column 1, paragraph 2).

As per claim 22, the same limitations are subjected to in claim one, therefore the same

rejections apply (see claim one above).

Conclusion

7. The following prior art made of record and not relied upon is considered pertinent to

applicant's disclosure:

A. Drissi et al., U.S. Patent No. 6,728,689;

B. Lewis et al., U.S. Patent No. 6,523,017;

C. Johnson et al., U.S. Patent No. 6,519,580;

D. Lewis et al., U.S. Patent No. 6,668,248;

E. Billet et al., U.S. Patent Application Publication No. 2002/0194148;

F. Opitz, U.S. Patent Application Publication No. 2002/0184169;

G. Weng, U.S. Patent No. 6,353,814;

H. Wolpert, U.S. Patent No. 5,535,301;

I. Chen, "A Notion for Machine Learning: Knowledge Developability";

J. Kovalerchuk et al., "Comparison of Relational methods and Attribute-based Methods

for Data Mining in Intelligent Systems";

K. Guvenir et al., "A Supervised Machine Learning Algorithm for Arrhythmia Analysis";

L. Ratsaby, "Incremental Learning with Sample Queries";

M. Ricci et al., "Data Compression and Local Metrics for Nearest Neighbor

Classification";

N. Lee, "An Information Theoretic Similarity-Based Learning Method for Databases";

O. Salzberg et al., "Best-Case Results for Nearest-Neighbor Learning";

P. Gregor et al., "Hybrid Pattern Recognition Using Markov Networks";

Q. Michel et al., "Tree-Structured Nonlinear Signal Modeling and Prediction"; and

R. Guan et al., "Protein Structure Prediction Using Hybrid AI Methods".

8.   An inquiry concerning this communication or earlier communications from the examiner should be directed to Kelvin Booker whose telephone number is (703) 308-4088. The examiner can normally be reached on Monday-Friday from 7:00 AM-5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight, can be reached on (703) 308-3179. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

An inquiry of a general nature or relating to the status of this application proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Anthony Knight
Supervisory Patent Examiner
Group 3600

K.E.B.

Art Unit 2121

June 24, 2004